

1      What is claimed is:

2      1. A face-to-face multi-chip flip-chip package comprising:

3            a package substrate having a top surface, a bottom surface and a concave wall  
4            between the top surface and the bottom surface, wherein the concave wall defines a  
5            chip accommodation space;

6            a first chip having a first active surface and a first back surface, wherein the first  
7            active surface of the first chip faces to the bottom surface of the package substrate;  
8            at least a second chip having a second active surface, a second back surface and a  
9            plurality of side surfaces between the second active surface and the second back  
10          surface of the second chip, wherein the second active surface of the second chip faces  
11          to the first active surface of the first chip; and

12          an underfilling material formed between the first chip and the second chip.

13      2. The face-to-face multi-chip flip-chip package of 1, wherein the chip accommodation  
14          space is an opening passing through the top surface and the bottom surface of the  
15          package substrate.

16      3. The face-to-face multi-chip flip-chip package of claim 2, wherein the opening is  
17          circular or elliptic shape.

18      4. The face-to-face multi-chip flip-chip package of claim 1, wherein a plurality of solder  
19          balls are formed on the package substrate.

20      5. The face-to-face multi-chip flip-chip package of claim 1, wherein the first chip is a  
21          logic chip.

22      6. The face-to-face multi-chip flip-chip package of claim 1, wherein the size of the first  
23          chip is larger than the size of the chip accommodation space.

24      7. The face-to-face multi-chip flip-chip package of claim 1, wherein the second chip is a  
25          memory chip.

26      8. The face-to-face multi-chip flip-chip package of claim 1, wherein the size of the  
27          second chip is smaller than the size of the first chip.

1        9. The face-to-face multi-chip flip-chip package of claim 1, wherein the size of the chip  
2                accommodation space is smaller than the size of the first chip and larger than the size  
3                of the second chip.

4        10. The face-to-face multi-chip flip-chip package of 1, wherein the second chip is  
5                disposed inside the chip accommodation space.

6        11. The face-to-face multi-chip flip-chip package of 1, wherein the underfilling material  
7                is filled in the chip accommodation space.

8        12. The face-to-face multi-chip flip-chip package of 1, further comprising a plurality of  
9                first bumps formed between the first chip and the package substrate.

10      13. The face-to-face multi-chip flip-chip package of 12, wherein the underfilling material  
11                encloses the first bumps.

12      14. The face-to-face multi-chip flip-chip package of 1, wherein the side surfaces of the  
13                second chip have a progressive distance from the concave wall.

14      15. The face-to-face multi-chip flip-chip package of 1, wherein the underfilling material  
15                is disposed between the side surfaces of the second chip and the concave wall.

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